

REMARKS

Claims 1-13 are all the claims pending in the application. This Amendment amends claims 1, 2, 5, 6, 7, and 8, adds claims 9-13, and addresses each point of objection and rejection raised by the Examiner. Favorable reconsideration is respectfully requested.

Applicant thanks the Examiner for indicating that the Declaration is acceptable, acknowledging the claim for foreign priority under 35 U.S.C. § 119, noting that the priority documents have been received from the International Bureau, and initialing the Information Disclosure Statement filed March 6, 2002.

Claims 1-8 have been examined. Claims 1-8 have been rejected under 35 U.S.C. § 112, second paragraph, and claims 1-8 have been rejected under 35 U.S.C. § 103(a).

I. Objections and Rejections Under 35 U.S.C. § 112, paragraph 2

The Examiner objects to the Abstract because the reference numbers are not in brackets. Applicant presents an amended Abstract believed to overcome this objection.

The Examiner asks that the specification be amended to correct any errors. In response, Applicant has reviewed the specification and made minor editorial amendments. No new matter is added.

Claims 1-2 and 6-7 are objected to for not distinguishing between the preamble and body of the claims. Claims 1, 6, and 7 are rejected under § 112, second paragraph, for various antecedence problems. Applicant submits claim amendments believed to overcome objections and rejections, with the exception of a rejection of claim 3 argued below. Additionally, Applicant has reworded claims 6 and 7 to emphasize the relationships between the elements of the membrane valve.

Claim 5, which depends from claims 1 and 2, is rejected for there being no antecedence for “elasticity applying means.” Claim 2 recites “elasticity applying means,” whereas claim 1 does not. Applicant adds claim 9, which depends from claim 1 and recites the “elasticity applying means.” Applicant has amended claim 5 to depend from claims 9 and 2. Claim 8 is

also rejected for there being no antecedence for “elasticity applying means.” Applicant has reworded claim 8.

Claim 3 is rejected for the recitation “wherein the membrane valve is arranged in a flowing passage connecting an ink cartridge and an ink jet recording head.” The Examiner asserts that this is misdescriptive because “the valve and the head are elements of the cartridge so that [sic] how the valve can connect the cartridge to the head.”

Applicant respectfully submits that the valve is not a necessarily part of the cartridge. For example, on page 8 of the specification, it is explained that in the exemplary embodiment shown in Fig. 5, the container 22 containing the membrane valve 1 is connected to an ink cartridge. While including the valve in the cartridge is an embodiment of the invention (*e.g.*, Fig. 6), clearly the invention is not so limited. Accordingly, Applicant submits that the scope of claim 3 is proper. Reconsideration is requested.

Applicant has also made various editorial changes to the claims to recite the limitations in a more positive manner. No new matter is added.

In view of the amendments to the claims, reconsideration and withdrawal of the objections and § 112 rejections are respectfully requested.

II. Rejections Under 35 U.S.C. § 103(a)

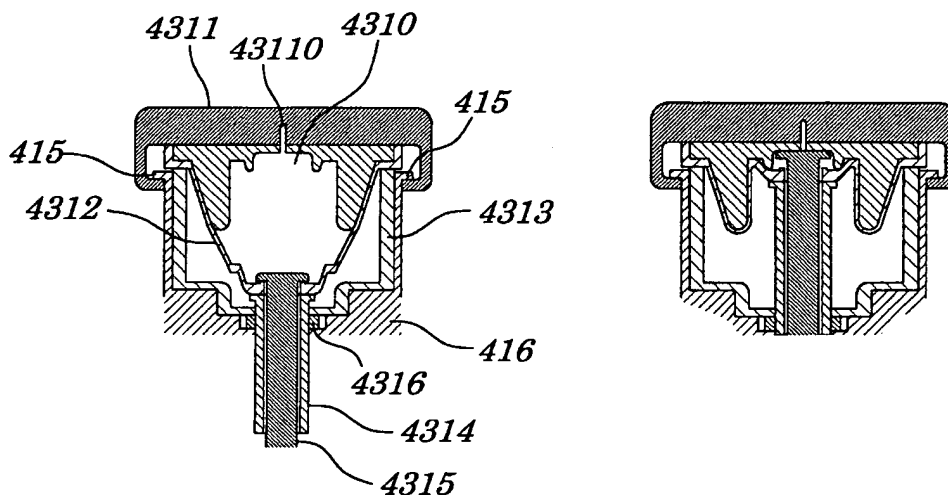
Claims 1, 3, 4, 5, 6, and 8 are rejected as unpatentable over U.S. Patent 6,394,137 to Kikuchi *et al.* (“Kikuchi”) in view of U.S. Patent 6,220,690 to Wachi (“Wachi”).

The present invention provides improved responsiveness from a membrane valve, responding to very small differential pressures. These results are achieved by employing a membrane valve structured as described in the present claims.

Kikuchi does not teach or suggest each feature of the present invention. In particular, the structure of the thin portion of the central region of the membrane valve.

Wachi discloses a diaphragm pump used to create a negative pressure on the nozzle of an ink jet so as to prevent contamination and clogging. The diaphragm pump is provided with a

cover 4311, a diaphragm 4312, a pump frame 4313, a shaft cover 4314, a shaft 4316, and a loading ring 4316. *See* column 4, lines 63-65. The diaphragm 4312 co-operates with the cover 4311 to form a pump chamber 4310 having variable volume. *See* column 5, lines 1-2. The shaft cover 4314 is used to supply a force that acts on a bottom surface 43120 of the diaphragm 4312 and push the diaphragm “in the direction to reduce the volume of the pump chamber 4310.” *See* column 5, lines 6-9.



The Examiner asserts that it would be obvious to use the diaphragm member 4312 “having an angled portion formed at a central region of the thin portion for allowing the diaphragm (4312) to stretch out without breaking.”

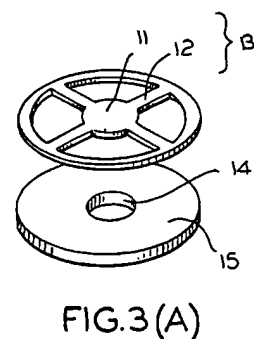
Applicant respectfully submits that the Examiner is engaging in hindsight. The object of Wachi is completely different from the object of the present invention, and the structures of Kikuchi and Wachi are completely different, and serving different purposes. The diaphragm 4312 of Wachi is neither a membrane nor a valve, but rather, a diaphragm of a pump. Neither Kikuchi nor Wachi talk about either “stretching out without breaking,” nor even describe such a problem or feature.

There is no suggestion that the diaphragm in Wachi even stretches. Rather, when pressed, the diaphragm 4312 of Wachi conforms to the shape of the inside surface of the diaphragm pump cover 4311, as shown in Figs. 5A and 5B.

Accordingly, Applicant submits that the claims are not obvious. There would be absolutely no motivation to look to Wachi to modify the Kikuchi. Reconsideration is requested.

Claims 2, 3, 4, 5, 7, and 8 are rejected as unpatentable over Kikuchi in view of U.S. Patent 4,882,596 to Tsuzuki *et al.* ("Tsuzuki").

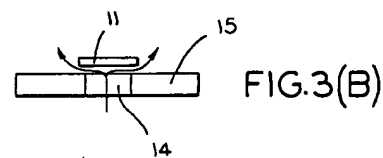
Kikuchi discloses a check valve comprising a valve member 13 including a valve plate 11 and arms 12, and a valve seat 15 having a flow path 14. The valve member 13 overlaps the valve seat 15, and is pushed up for forward flow when the ink is caused to flow between the valve 11 and the valve seat 15. The valve is pushed against the valve seat to stop the backward flow of the ink flow. *See* column 3, lines 38-47.



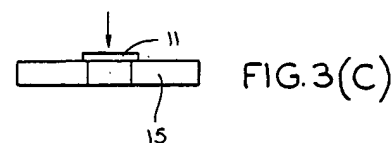
The Examiner asserts that it would have been obvious to incorporate "the teachings of the ribs taught by Tsuzuki *et al* into the valve device of Kikuchi *et al* for the purpose of supporting the membrane.

The claims require the thin portion of the membrane valve to be formed as "an approximately flat surface having plural *protruding* rib portions...", such that the protruding ribs extend from the thin membrane. Accordingly, both the flat surface of the thin portion and protruding rib portions are required.

Applicant again submits that the Examiner is attempting to engage in hindsight. There is no teaching in either Kikuchi or Tsuzuki which would suggest using the arms 12 for any kind of support, other than supporting valve plate 11. The arms 12 are not ribs, but rather, hold the valve plate 11 over the flow path 14. Clearly, the arms 12 allow ink to flow through the valve member 13



(*i.e.*, between the arms 12). The valve plate 11 more closely resembles the fixed valve seat 4 of Kikuchi (*see* Kikuchi Fig. 1) than the disc shaped valve body 1 of Kikuchi, in that if one were to overlay the valve member 13 of Tsuzuki on the disc shaped valve body 1 of Kikuchi, the ink



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supply port 3 would be blocked. There is no reason offered in either Kikuchi or Tsuzuki to consider supplementing the disc shaped valve body 1 of Kikuchi with the arms of Tsuzuki. Moreover, even with the benefit of hindsight, it is unclear how the cited features of Tsuzuki could be applicable to Kikuchi. Reconsideration is requested.

III. New claims

Applicant submit new dependent claims 10 and 11 to require that a shape of the angled portion is selected from the group consisting of a "V" shape and a "U" shape. Applicant also submits new dependent claim 9 (discussed above) and independent claims 12 and 13. No new matter is added. Consideration of new claims is requested.

IV. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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